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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/752,750 | 12/27/2000 | Ronen Zohar | 42390P10415 | 9597 |

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| EXAMINER | |
|---|---|
| DO, CHAT C | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2124 | |

DATE MAILED: 05/21/2004

4

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/752,750 | ZOHAR, RONEN | |
| | Examiner | Art Unit | |
| | Chat C. Do | 2124 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *09 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-36 and 40-45* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *24-30 and 43* is/are allowed.

6)☒ Claim(s) *1-23, 31-36, 40-42, 44-45* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 December 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

1. This communication is responsive to Amendment A, filed 04/09/2004.

2. Claims 1-36 and 40-45 are pending in the applications. In Amendment A, claims 37-39 are cancelled and claims 43-45 are added. This action is made non-final.

3. Claims 1-36 and 40-45 are examined.

### *Claim Rejections - 35 USC § 112*

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 5-7, 9-12, 14-17, 40-42, and 44-45 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Re claim 5, the limitations "'AND' operator" in line 2 and "'OR' operator" in line 3 are indefinite because they do not clearly define the structure nor require a particular structure to perform the operation. For examination purposes, the examiner considers these operators as just operations to extract a sign bit and generate an adjustment value respectively.

Re claim 9, the limitations "SUBTRACT operator" in line 6, "less-than comparator" in line 8, and "AND operator" in line 10 are indefinite because they do not clearly define the structure nor require a particular structure to perform the operation. For examination purposes, the examiner considers these operators as just operations to

compute a fractional portion of the input value and to generate an adjustment value respectively. Claim 9 also has the same problem.

Claim 40 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: the Boolean mask. In the claim, there is a fourth code segment to generate a Boolean mask, but it does not utilize in the claim.

Thus, claims 6-7, 10-12, 15-17, 41-42 and 44-45 are also rejected for being dependent on the rejected base claims 5, 9, 14, and 40 respectively.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1-2, 4, 18-19, and 31-32 are rejected under 35 U.S.C. 102(e) as being anticipated by Yuval (U.S. 6,535,898).

Re claim 1, Yuval discloses in Figures 1-3, and 5 a computing system (Figure 1) comprising: a rounding apparatus (abstract) to accepts an input value (310) that is a real number represented in floating-point formats and to perform a rounding operation on the input value to generate an output value that is an integer represented in floating-point format (abstract lines 1-4 and col. 1 lines 59-63); a memory (141) to store a computer program that utilizes the rounding apparatus; and a central processing unit (CPU) to execute the computer program, the CPU (110) is cooperatively connected to the rounding apparatus and the memory (Figure 1).

Re claim 2, Yuval further discloses in Figures 1-3, and 5 the rounding apparatus uses a truncation technique to round the input value (abstract line 2).

Re claim 4, Yuval further discloses in Figures 1-3, and 5 the rounding apparatus rounds the input value to the nearest integer (col. 1 lines 65-67).

Re claim 18, it is a method claim of claim 1. Thus, claim 18 is also rejected under the same rationale in the rejection of rejected claim 1.

Re claim 19, Yuval further discloses in Figures 1-3, and 5 the process of converting the input value to a first integer comprises: representing the first integer in an integer format (320).

Re claim 31, it is a machine-readable medium instruction claim of claim 1. Thus, claim 31 is also rejected under the same rationale in the rejection of rejected claim 1.

Re claim 32, it is a machine-readable medium instruction claim of claim 1. Thus, claim 32 is also rejected under the same rationale in the rejection of rejected claim 1.

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 3, 5-6, 20-22, 33-34, and 36 are rejected under 35 U.S.C. 103(a) as being obvious over Yuval (U.S. 6,535,898) in view of Fukagawa (U.S. 6,510,446).

Re claim 3, Yuval discloses in Figures 1-3, and 5 the round apparatus includes a floating-point to integer converter to truncate the input value to convert the input value to an integer represented in an integer format (abstract lines 1-4 and 320 in Figure 3). Yuval does not disclose an integer to floating-point converter to convert the integer represented in an integer format to the output value. However, Fukagawa discloses in Figure 1 clearly a floating-point calculation including an integer to floating-point converter (19) to convert the integer represented in an integer format to the output value. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to add an integer to floating-point converter to convert the integer represented in an integer format to the output value as seen in Fukagawa's invention into Yuval's invention because it would enable to easily process in floating-point system.

Re claim 5, Yuval discloses in Figures 1-3, and 5 the rounding apparatus includes: an "AND" operator to extract a sign bit of the input value (520 in Figure 5); an "OR" operator to generate an adjustment value based on the sign bit (+/- 0.5 in either 531, 533,

563, or 561 in Figure 5); an ADD operator to compute an adjusted input value by adding the adjustment value to the input value (533 or 561), the adjusted input value is a real number represented in floating-point format (533 as floating-point); a floating-point to integer converter to truncate a fractional portion of the adjusted input value to convert the adjusted input value to an integer represented in an integer format (534 or 562). Yuval does not disclose an integer to floating-point converter to convert the integer represented in an integer format to generate the output value. However, Fukagawa discloses in Figure 1 clearly a floating-point calculation including an integer to floating-point converter (19) to convert the integer represented in an integer format to the output value. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to add an integer to floating-point converter to convert the integer represented in an integer format to the output value as seen in Fukagawa's invention into Yuval's invention because it would enable to easily process in floating-point system.

Re claim 6, Yuval in view of Fukagawa does not disclose the "AND" operator extracts the sign bit of the input value by performing a bit-wise logical AND operation on the input value and a sign mask. However, the examiner takes an official notice that the method of extracting the sign bit from the input value using a bit-wise logical AND is known in the art. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to add a logical AND operator to determine the sign bit of the input value because it would increase the system performance and reduce the circuitry.

Re claim 20, it is a method claim and has a limitation cited in claim 3. Thus, claim 20 is also rejected under the same rationale in the rejection of rejected claim 3.

Re claim 21, Yuval discloses in Figures 1-3, and 5 method comprising: building an adjustment value represented in floating-point format (531, 533, 563, and 561 in Figure 5 as 0.5); adding the adjustment value to an input value to generate an adjusted input value represented in floating-point format (531, 533, 563, 561 in Figure 5); truncating the adjusted input value to convert the adjusted input value to a first integer represented in an integer format (532, 534, 564, and 562 in Figure 5). Yuval does not disclose an integer to floating-point converter to convert the integer represented in an integer format to the output value. However, Fukagawa discloses in Figure 1 clearly a floating-point calculation including an integer to floating-point converter (19) to convert the integer represented in an integer format to the output value. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to add an integer to floating-point converter to convert the integer represented in an integer format to the output value as seen in Fukagawa's invention into Yuval's invention because it would enable to easily process in floating-point system.

Re claim 22, it is a method claim and has a limitation cited in claim 6. Thus, claim 22 is also rejected under the same rationale in the rejection of rejected claim 6.

Re claim 33, it is a machine-readable medium instruction claim and has a limitation cited in claim 3. Thus, claim 33 is also rejected under the same rationale in the rejection of rejected claim 3.

Re claim 34, it is a machine-readable medium instruction claim of claim 5. Thus, claim 34 is also rejected under the same rationale in the rejection of rejected claim 5.

Re claim 36, it is a machine-readable medium instruction claim of claim 5. Thus, claim 36 is also rejected under the same rationale in the rejection of rejected claim 5.

10. Claims 8 and 13 are rejected under 35 U.S.C. 103(a) as being obviou over Yuval (U.S. 6,535,898) in view of Bechade (U.S. 5,511,016).

Re claims 8 and 13, Yuval does not disclose in Figures 1-3, and 5 the rounding apparatus rounds the input value toward minus infinity or plus infinity. However, Bechade discloses in Figure 3A a system capable of rounding the input value toward minus infinity (110 part of Figure 3D) or plus infinity (110 part of Figure 3C). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to add a rounding toward minus infinity or plus infinity as seen in Bechade's invention into Yuval's invention because these rounding operations are necessary for performing efficiently floating-point mathematical operations (col. 1 lines 21-22).

***Allowable Subject Matter***

11. Claims 43 and 24-30 are allowed.

12. Claims 7, 9-12, 14-17, 23, 35, 40-42, and 44-45 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

***Conclusion***

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. U.S. Patent No. 6,292,815 to Abdallah et al. disclose a data conversion between floating-point packed format and integer scalar format.

b. U.S. Patent No. 6,205,461 to Mansingh discloses a floating-point arithmetic logic unit leading zero count using fast approximate rounding.

c. U.S. Patent No. 5,764,555 to McPherson et al. disclose a method and system of rounding for division or square root: eliminating remainder calculation.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chat C. Do whose telephone number is (703) 305-5655. The examiner can normally be reached on M => F from 7:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chaki Kakali can be reached on (703) 305-9662. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chat C. Do
Examiner
Art Unit 2124

May 3, 2004

TODD INGBERG
PRIMARY EXAMINER